

# SCOPE OF SERVICES

## Purpose

The City of Atlanta (COA) seeks qualified proposals from qualified firms, knowledgeable, and experienced Prime Contractors to provide Information Technology (IT) Professional Services to support our in-house Atlanta Information Management (AIM) Department. We encourage vendors to submit the most comprehensive proposal possible offering the highest quality of service.

The nature of the service will be ongoing support and coordination with the in-house Executive Infrastructure Director and/or Executive Security Director or designee to ensure proper implementation of; new technology; general management and operation; along with maintenance of existing systems; and issue mitigation. The Prime chosen will work closely with a variety of departments within the COA, providing support as needed or instructed.

The Prime will provide general professional services on an as-needed basis primarily during normal business hours: M-F 8:00 a.m. to 5:00 p.m. either remotely (based on COA approval) or on-site. However, The Prime must be available 24 hours a day 7 days a week, including holidays. When a project is initiated, the COA would like for the Prime to be available and ready to work after the COA approval process is completed. The Prime contractor will need to be ready to fulfill requirements as requested. Each project will have its own requirements, which, will be provided at the time of the project request/work order. The Primes are responsible for parking. The COA will provide the hardware (HW), software (SW), infrastructure, and subsequent licensing for the solutions to be supported or implemented.

Multiple Master Agreement awards are anticipated. Awards will be made by IT Professional Consulting Services categories. The Prime Contractors may be awarded a Master Agreement in one or multiple categories. **The Prime must provide information and pricing for each IT Professional Consulting Services category\position in their proposal submissions.**

Requested Services may range from major turnkey projects (complete start to finish and ready for use) to smaller projects and/or ad-hoc consulting. Master Agreements will result from this solicitation with subsequent Purchase Order agreements awarded.

## Scope of Services

The services required will include, but are not limited to, on-going technical support, long term partnering for major implementations, migrations, and/or upgrades. **The Prime responding to this solicitation must submit responses for all positions in the entire scope of services.**

### IT Professional Consulting Categories

These job classifications for the types of services are in the following IT Professional Pool Categories:

- Programmer Analyst
- Web Developer
- Database Architect (DBA)
- Cloud Architect
- Cloud Admin
- Cloud Developer
- Solutions Developer

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- Network Engineers: Routing/Switches
  - Network Engineers: Wireless Infrastructure
  - Network Architect
  - Telecom Architect/Consulting
    - Circuits
      - Planning, design and acquisition
      - VOIP
  - Cabling
  - Security Engineer
  - Server Engineers
  - Business Systems Analysts
  - Quality Assurance Analysts
  - Six Sigma Black Belt
  - Business Intelligence Specialist (Analytics)
  - Geographic Information Specialist
  - Change Management Specialist
  - Project/Program Manager
  - Technical Writer
  - RF Engineer
  - NOC Engineer

Please see full IT Professional Consulting Categories descriptions on page 8.

### **Types of Services**

Professional Consulting Services for the above reference IT Professional Consulting Categories may include, but not be limited to, the following:

#### **Change Management/Strategic Planning**

Services to include development of strategic plans on the agency, perform tactical business process analysis, create proposals for process redesigns, and/or develop one or more of following: communication, user acceptance, organizational transformation, and structural reorganization. Ability to provide guidance and support from initial concept, proposal development, through to implementation and evaluation.

#### **Limited time, ad hoc consulting efforts:**

Services will focus on the shorter term (typically weeks to months) with specific contracts awarded. Scopes of Services (SOS) will typically be presented by the COA for isolated tasks of limited duration aimed at the resolution of one or more specified issues. This SOS may cover either technical or functional areas. This SOS may cover processes that are part of a major upgrade or implementation may deal with issues associated with other IT or functional user related areas, such as:

- Technology needs assessments;
- Technology organization issues;
- Training in technical and functional areas

Tasks may range from purely technical to purely functional or a mixture of both. Task orders may be as short as a single day or may extend over months.

*Examples of a typical ad-hoc consulting effort might be:*

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- Provide a The Prime for two weeks to assist COA staff in the building of a particular vendor product related data table.
  - Provide specific help with database issues or migrations in either Oracle, MS SQL Server or others;
  - Provide specific help with network performance tuning and optimization;
  - provide specific help with server migration, virtualization, and cloud planning;
  - Conduct business process improvement, business process re-engineering, or Fit Gap analysis of a technology or functional unit and make recommendations for service improvement to internal or external customers;
  - Assign a subject matter expert to the COA staff member to assist in identifying and/or resolving a specific technical issue

### **Technology Implementation, Upgrade and Integration**

Capability to provide either full lifecycle services or ad hoc problem solving for commercial-off-the-shelf, SaaS, or cloud-based platforms to include initial implementation, upgrade management and all related services. It is anticipated that respondents in this category would have significant bench strength to meet long term needs of major projects or the appropriate experience and availability for meeting specialized needs related to implementation, upgrade and integration of infrastructure or applications. Services under this section may include full range of consulting to include project management, technical and functional user support throughout the project lifecycle.

### **Desktop and Application Support**

Perform basic support functions as needed/requested, including the installation of PC's, laptops, tablets, printers, peripherals, and software. The Prime Consultant will diagnose and correct desktop applications issues, configure all computers for standard applications and identify and correct end user hardware problems and perform advanced troubleshooting.

### **Technology Management**

Includes services related to support of IT specific functions including technical architecture, strategic information system planning, project management, audit preparation and response, data base management, hardware configuration, software quality assurance, technical design and implementation. Ability to provide recommendations for operational improvement and performance management.

### **Transition to Cloud Applications, Management and Support Services**

Provide decision support, institutional readiness assessment, guidance and transition assistance for movement of on-premises software to cloud environments. Provide professional services and/or support for hosting or managed services transitions and implementation tasks, including, but not limited to, providing the managed services and/or hosting services on an ongoing basis. Develop recommendations and tactical steps to implement shared services environments either on-premises or cloud based.

Types of services/applications being transitioned may be on the scale of:

1. Migrating on-premises applications to cloud-SAAS offering
2. Storage solutions
3. Implementing various IAAS, PAAS, or SAAS solutions

### **Cloud Resource Financial Management**

Aligning cloud pricing models and technology with business strategy, budgets and goals while working directly with the COA staff in gathering requirements to analyze, design and/or manage cloud solutions.

### **Training/Knowledge Transfer**

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Ability to provide training programs for both cloud and ancillary software for either technical staff, functional users or both. Training may be on-premises, vendor site or virtual as needed by the COA.

### **Analytics**

Provide professional services for the development and/or implementation of analytics products and tools. Assist with or perform data analysis, business intelligence, artificial intelligence (AI), reporting, KPI development, dashboards, predictive analytics, data warehouses and other statistical tasks.

### **Server Engineering and Administrative Services**

Manage computer network and associated hardware, software, communications and operating systems necessary for the quality, security, performance, availability, recoverability and reliability of the system. Monitor server performance and capacity management services. Ensure scheduled preventive maintenance for equipment is promptly performed. Develop back-up plans and procedural documentation. The Prime Consultant shall be responsible for configuration management, including changes, upgrades, patches, etc.; and support of software products relating to servers and workstations; timely response to repair and maintenance work for the user. The contractor shall manage the COA's email system and domain name services.

### **Network Implementation and Administration Services**

Maintenance and support of network equipment, including switches, firewalls, routers and other security and edge devices. Installation, configuration and maintenance of network devices. Analyze routine configuration changes and install software patches and upgrades. Complete proactive monitoring of network equipment including alert notifications to COA's Executive Infrastructure Director in the event of device failure. Network performance and capacity management services, and network troubleshooting. Maintain network documentation and procedures. Create dashboard for network monitoring and performance tuning.

### **Network Wireless Implementation and Administration Services**

Installation process should include delivery, inventory tagging, dismounting of existing access point and mounting of new access points. The implementation and configuration of the wireless networking equipment and peripherals. It should be inclusive of physical onsite setup, configuration, testing roll out and training. Assess the current wireless network SSIDs map to local VLANs for routing inside the network.

### **Infrastructure Cabling**

To include, but not limited to, fiber, UTP, and coax. Install and remove CAT5e, CAT6, RG6 and other coax, other low voltage & fiberoptic cabling. Installation and maintenance of fiber optic equipment includes drop wires, station protectors, and network interface devices, and may include initial wiring or rewiring. Data and phone cable installation, as well as, terminations, punch down of jacks, patch panel and rack installation.

### **Disaster Recovery, Business Continuity and Backup efforts**

The Prime shall develop a business impact analysis, hazard and risk assessment, business continuity strategies, and disaster recovery plan.

1. Business Impact Analysis – strategies and measures to diminish vulnerability to incidents that could lead to major losses or disruptions; provision of a plan to ensure the continuity of services in case of a significant loss or disruption and increasing staff's ability to face worst-case scenarios.
2. Hazard and Risk Assessment - Identification of potential hazards, probability of occurrence and analysis of what could happen if a hazard occurs
3. Business Continuity Strategies – Planning and preparation to ensure that the Agencies can continue to operate in case of serious incidents or disasters and can recover an operational state within a reasonably short time.

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4. Redundancy and back-up strategies and plans.
  5. Development of a robust Disaster Recovery Plan which utilizes the components contained in numbers 1-3 above.
  6. The scope of service includes a vulnerability assessment to address:
    - o Identifying current security and planning weaknesses
    - o Providing potential solutions to these weaknesses
    - o Implementing a disaster prevention program

**Security**

Ensure that all servers, desktops and laptops are protected by antivirus software and that adequate firewalls are in place to prevent unwanted intrusion into the COA's computer network system. Systems shall be designed to notify COA's Security Executive Director or designee when system securities are breached and or when system hardware is not operating efficiently. The Prime shall perform security audits as requested and notify COA's Security Executive Director immediately of suspected breach of security or intrusion detection.

A backup system shall be established to prevent loss of data and functionality as well as reduce downtime. The Prime shall configure COA's system to enable remote access in a secure environment and provide remote access administration as requested by the COA Security Executive Director.

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## **Planning**

The Prime shall engineer, plan and design services for major system enhancements, including installations and upgrades of new and existing systems. Examples include major server upgrade, storage system upgrades, redesign of backup systems, etc. Provide technical leadership for server technology issues. Make recommendations for future purchases of hardware, software and technology needs. Install new servers, software and hardware and transfer data when acquired. Strategic planning, design and installation/upgrade of core network systems. Examples include major network upgrades, provider changes, IP schema design, installation of core network devices, etc.

## **On Demand Response**

The Prime contractor shall offer on-demand response to the COA's IT requests. The Prime shall have access and be available during the COA's normal business hours. It is expected that The Prime is to perform maintenance service after hours and on weekends in situations which would least likely disrupt daily operations. Specific times and dates shall be coordinated with the Executive Infrastructure Director.

## **Confidentiality**

Confidentiality of computer information and data is vital. The selected Prime contractor and their employees will be required to sign and adhere to a confidentiality clause that information in the system must remain confidential under penalty of law.

## **IT Professional Consulting Descriptions**

### **Web Developer/Programmer Analyst**

- Analyzes existing programs or formulaic logic for new systems, devised logic procedures, prepares flow-charting, performs coding and tests/debugs programs.
- Develops conversion and system implementation plans.
- Prepares and obtains approval of system and programming documentation. Recommends changes in development, maintenance, and system standards.
- May train users in conversion and implementation of system.
- Knowledge of fundamentals of programming.
- Provides technical support and/or application development using a variety of application tools and environments.
- With internet, intranet or extranet based applications, including but not limited to: C++, Java, XML, HTML, CGI, ASP, .Net, Java, HTML5, Python, CSS3, WordPress, Joomla multimedia applications, database interactions, and data modeling tools.
- Be familiar with the application of agile method and tools
- Familiarity with Docker Containers, Visual Studio, GitHub, Bit Bucket, Kubernetes, etc.
- Researches, tracks, and understands new web technologies to provide technical leadership in developing applications and analyzing business requirements as they pertain to intranet and external Internet related systems.
- Provides written design documents, test plans, and test results.
- Manages, develops, integrates and implements related applications components, including front-end maintenance, technical support, documentation and administration of the applications.
- Establishes and communicates standards to manage cost and ensure continuity of applications.

### **Database Architect (DBA)**

- Experience with installations and upgrades of Oracle server software and SQL server software, creating databases, database objects, users, roles, etc.

- Experience with Oracle RAC database, including database version upgrading, database migration and apply database patch.
- Experience with SQL Plus, T-SQL, PL/SQL, CRON, Oracle, SQL Server, NoSQL, MySQL, stored procedures/packages, impdp/expdp, shell scripting.
- Strong knowledge of Oracle RAC on Linux.
- Experience with database performance tuning and support of Grid Control.
- Must be able to work with the DBA team and other IT teams to debug and resolve critical issues.

### **Cloud Architect/Admin/Developer – AWS and Azure**

- Strong network skills
- Understands core concepts and applicability to virtual/physical/logical networks
- Datacenter infrastructure management – server and other hardware installation, maintenance, and management
- VMWare vSphere Power CLI
- VCP6, VCP6.5 or VCP7 certifications preferred
- Other scripting languages
- Expert understanding of Active Directory and Group Policy management
- Azure infrastructure, services, and governance
- Microsoft Certified Azure Administrator certification preferred
- Storage and SAN management and performance analysis – array and host configuration expertise
- BC/DR expertise across on-premises and public cloud environments
- 2-year college degree and 5 years of relevant technology experience or High School Diploma and 10 years of relevant technology experience
- Microsoft Azure or AWS Certification preferred

### **Solutions Developer**

- Demonstrated experience in a solutions and/or sales engineering role; solid experience in a Systems Administration role (Microsoft, LINUX or VMware)
- Excellent verbal and written communication skills – able to explain complex concepts to a wide variety of individuals with varying technical skills
- Strong understanding of Internet/IP related technologies including, but not limited to, routing, switching and sub-netting
- Understanding of core ISP technologies such as DNS, SMTP, HTTP/S and WAN
- Knowledge of Fiber channel/iSCSI/SAS storage arrays. Understanding of concepts such as RAID
- Virtualization technologies with a focus on administration AND design and architecture
- Network Security, Backup and backup related technology experience
- Experience with Disaster Recovery technologies and Disaster Recovery testing and planning
- Experience with Firewall solutions, load balancing and high availability technologies
- Demonstrated experience in a solutions and/or sales engineering role; solid experience in a Systems Administration role (Microsoft, LINUX or VMware)
- Excellent verbal and written communication skills – able to explain complex concepts to a wide variety of individuals with varying technical skills
- Strong understanding of Internet/IP related technologies including, but not limited to, routing, switching and sub-netting
- Understanding of core ISP technologies such as DNS, SMTP, HTTP/S and WAN
- Knowledge of Fiber channel/iSCSI/SAS storage arrays. Understanding of concepts such as RAID
- Virtualization technologies with a focus on administration AND design and architecture

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- Network Security, Backup and backup related technology experience
  - Experience with Disaster Recovery technologies and Disaster Recovery testing and planning
  - Experience with Firewall solutions, load balancing and high availability technologies

#### **Network Architect/Engineers/Admin:**

- Analyze business requirements to develop technical network solutions and their framework.
- Perform network modelling, analysis, and planning.
- Develop technology roadmaps.
- Write functional requirements/specifications documents.
- Oversees the installation process or may occasionally participate in it
- Tests the system to ensure it is working as anticipated
- Makes modifications to existing systems based upon new equipment or changes in technology
- Troubleshoots problems in order to identify their source and quickly resolve them
- Plans for the security of a given network
- Recommends different types of hardware and software to be used with the network they design
- Performs research in order to identify new equipment and applications that would be compatible with a given network
- Modifies plans as needed in order to stay within the budget established by the company
- Reviews documentation updates and shares with support teams as required.
- Managing and troubleshooting Palo Alto group firewall permissions

#### **Highly Desired Skills:**

- Cisco CCIE RS, CCIE Data Center, CCIE VoIP, or CCAr preferred
- Routing/Switches – e.g., Cisco, and familiarity with Software Defined Networks, Wireless Infrastructure, etc.
- Collaboration - Cisco CallManager, Unity Connections, Cisco CME a plus)
- Data Center Route/Switch - Nexus, ASR and Cisco CLIENT
- Contact Center - Cisco UCCE
- Security - Cisco ASA, Checkpoint, VPN

#### **Qualifications**

- Ideal candidate will have a strong networking background with a focus on Cisco hardware.
- Experience configuring and maintaining Routers and Switches.
- Experience configuring and maintaining wireless APs and controllers.
- Experience with Cisco IOS, F5 a plus.
- Experience with configuring and maintaining Firewalls, IPS/IDS, and monitoring tools.
- Familiar with VoIP Technologies - (Collaboration - Cisco Call Manager, Unity Connections, Cisco CME a plus)
- Familiar with SAN/NAS technologies
- (Familiar with Virtual Server Technologies (VMware)
- Familiar with TACACS+/Radius and AAA
- Familiar with Mobile Device Management (MDM) Servers
- Individual must possess and be able to demonstrate a sound working knowledge of configuring and supporting core networking devices leveraging the following common protocols: TCP/IP, DNS, DHCP, VPNs, STP, VLANs, ACLs, BGP, OSPF, EIGRP, QoS, DMVPN, VRF, BGP, and MPLS (TDM & Ethernet hand-offs). Layer 2 & Layer 3 switching

#### **Telecom Architect/Consulting**

- Circuits

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- Planning, design and acquisition
  - VOIP
  - Plans, designs and implements local and wide-area network solutions between multiple platforms and protocols (including IP and VOIP).
  - Supports/troubleshoots network issues and coordinates with vendors for installation of such items e.g. routers, switches.
  - Provides training and assists with proposal writing.
  - Conducts project planning and project implementation, cost analysis and vendor comparisons.
  - Good knowledge of concepts, processes and tools for IT network development and modification; knowledge of related disciplines.
  - Skills sufficient to carry out most typical professional assignments; skills in interpersonal communications and in presenting information.
  - Ability to apply experience and professional knowledge to carry out most assignments in professional area; ability to apply general knowledge across organization or discipline lines.

### **Cabling Installer**

- Install, terminate, and troubleshoot CAT6 riser and shielded cables on patch panels and RJ-45 modular plugs.
- Route cabling in many different building types through the existing riser closets. Create new pathways for cabling to route from MDF to IDF closets and to the rooftop of buildings by coring and using EMT conduit, sleeves, and PVC.
- Install various roof mount types and wireless radios on each building. Calibrate wireless radios with other team members to create a connection from one building to another.
- Install server racks and equipment in the MDF and IDF closets. Organize cabling using D-rings, O-rings, clamps, cable organizers, etc.
- Be a member to our on-call team one week per month with 24/7 availability for emergency purposes.
- Experienced understanding of CAT5/6 terminations, including using an RJ-45 crimping tool, punch down tool, cable tester, keystone jacks, modular plugs, patch panels.
- Ability to lift heavy and large objects, climb ladders, and work on tall buildings.
- Demonstrates high ethical standards, strong work ethic with an emphasis on team commitment.

### **Security Engineers**

- Researches attempted efforts to compromise security protocols and documents suspicious activity.
- Strong knowledge in but not limited to, PCI, ISO, NIST, Red Hat, Palo Alto, ForeScout, and Malware Bytes.
- Maintains security systems for routers and switches and checks their functionality regularly.
- Administers security policies to control access to systems.
- Maintains the City's fire wall.
- Uses applicable encryption methods.
- Provides information to management regarding the negative impact on the City caused by theft, destruction.
- Alteration or denial of access to information.
- Maintains up to date knowledge of the current state of systems security practices, latest threats to system security and monitoring protocols to manage existing safety systems.
- Good knowledge of concepts, processes and tools utilized in maintaining network security; knowledge of related.
- Processes and procedures.

- Skills sufficient to carry out most typical professional assignments; skills in interpersonal communications and in presenting information.
- Ability to apply experience and professional knowledge to carry out most assignments in professional area;
- ability to apply general knowledge across organization or discipline lines.

### **Server Engineers**

- Strong knowledge in but limited to, Linux, Windows Server, VMWare, and Hyperconverged environments
- Provide tactical execution against complex project scopes – design, configure, deploy, and support new/existing infrastructure deployments
- Provide end-user training and support
- Create and update technical documentation, including runbooks, network diagrams, IP management, configuration/build guides, as-builts, etc.
- Plans, designs and implements an Active Directory migration
- Responsible for maintaining detailed time tracking / daily time entry within Autotask
- Responsible for creating detailed documentation outlining how systems were configured and creating end-user guides to COA's standards.
- Manage, track and report project budgets and reports
- Ensure client satisfaction from the beginning to end of project
- Projects you will lead/Implement may include but are not limited to:
- Email Migrations – Exchange to Exchange, Exchange to Cloud
- Office network deployments (firewall, switching, wireless, UPS devices)
- File Sharing Services – Windows-based file server to cloud systems such as Egnyte, Box, OneDrive, etc.
- Security integrations such as Single Sign On (SSO) and Multi-Factor Authentication (MFA), leveraging providers
- Work with audio/video and/or phone system vendors to deploy new systems
- Manage an office relocation with the assistance of our Project Managers
- Server Upgrades / Migrations (Windows Server 2019 / 2016 / 2012 R2)
- Ability to configure, maintain, and troubleshoot on key technologies, including:
- VMware vSphere
- Advanced knowledge of VMWare distributed switching
- VMWare VCP certification preferred
- Microsoft Windows Server (2019 / 2016 / 2012 R2)
- Microsoft Active Directory (Group Policy, DHCP, DNS, NPS, etc.)
- Exchange Server (2019, 2016, 2013, 2010)
- VPN Clients (Cisco, Fortinet)
- Firewalls (Fortinet, Cisco)
- Wireless Technology (Aerohive, Meraki, Ubiquiti)
- Remote Desktop (MS RDS, Citrix)
- Cloud Services (O365, Egnyte, Centrify/iDaptive, Box/DropBox, etc.)
- Storage (HPE Nimble, DellEMC, Synology, etc.)

### **Storage Solutions and Backup Architect**

- Experience with architecting and delivering disaster recovery and techniques.
- Understand of storage and virtualization protocols such as fiber channel, iSCSI, SMB, NFS, CIFS
- Knowledge of storage concepts and architecture related to EMC and NetApp hardware
- Assist in developing migration plans and development of tiered storage.

- Configure and validate data replication strategies as required Backup and recovery applications (Netbackup, Veeam, Zerto, NetAPP, Isolon, Avamar, Data Domain, EMC Networker, Spectrum Protect / Tivoli, HP Data Protector and Netvault, etc.)
- Preferred skills around Windows, Linux, AIX, Solaris OS, DB/2, Oracle, Exchange, and SQL
- Applied knowledge of LAN network components
- Experience with various forms of data storage
- Monitor and resolve backup issues.
- Monitor ITSM tool for tickets and requests. Updating backup schedules, monitoring and responding to failed backup instances
- Execute on file restore requests
- Assist in determining probable cause of issues and work with other support teams to resolve those issues
- Engineering and designing backups and DR in a large scale, multi-site environment of greater than 3 PB of data
- Experience with VMware Esxi 6.5 and VCenter

### **Business Systems Analysts**

- Analyzes complex business problems and processes and recommends efficiencies using automated solutions or process reengineering.
- Provides technical expertise to business units in identifying, evaluating, and developing system(s) solutions that are cost effective and meet business unit(s) requirements.
- Performs business analysis utilizing current best practices as recommended by the International Institute of Business Analysis Knowledge Areas. (i.e. Business Analysis Planning & Monitoring; Elicitation & Collaboration; Requirements Life Cycle Management; Strategy Analysis; Requirements Analysis and Design; Solution Evaluation & Recommendation).
- Performs research based on accepted research techniques incorporating information from (but not limited to) industry accepted professional organizations, relevant vendors, and acceptable market research firms such as Gartner and Forrester.
- Prepare for and present presentations to stakeholders, project teams, and relevant review committees as required.
- Creates business case and other related documents as required for organizational Business Analyst.
- Assist assigned Project Managers with project planning and execution as necessary.
- Create, review, and propose solution architectural diagrams.
- Research, document and present project related business unit processes\workflows utilizing the appropriate tools and processes.
- Lead, work as a team, member and collaborate on cross-functional teams.
- May be required to work with Developers (vendors), QA Testers, Project Managers and business unit representatives to articulate, develop, test, and validate functions for applications or network platforms\architectures.
- Work with business unit teams to develop high level cost estimates and possible ROI estimates.
- Manage multiple competing priorities through effective communication and coordination.
- Works with Procurement, Project Managers, Legal, Business Unit Representatives to navigate the procurement process when required following organizational procurement procedures.
- Responsible for BA Team development, performance goal-setting as authorized by organizational reporting manager.
- Knowledge of concepts, theories, and best practices as set forth by a related professional organization such as the International Institute of Business Analysis (preferred) or Project Management Institute.
- Well-developed communication and collaboration skills.

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- Professional documentation and presentation abilities within a technical and business organization.
  - Skills in organization and proposal/business case creation and presentation.
  - Ability to create reports and debrief C-Level executives and other organization members.
  - Capability to build and maintain relationships within the organization.
  - Utilization of the appropriate tools (at minimum) such as Office365 (Word, Excel, PowerPoint), Microsoft Visio, and Microsoft Project.
  - Aptitude to create use case scenarios and functional specifications.
  - Six Sigma Black Belt

### **Quality Assurance Analysts (QA)**

- Analyzes existing programs or formulaic logic for new systems, devised logic procedures, prepares flow-charting, performs coding and tests/debugs programs.
- Develops conversion and system implementation plans. Prepares and obtains approval of system and programming documentation. Recommends changes in development, maintenance, and system standards.
- May train users in conversion and implementation of system.
- Decision Making Selects from multiple procedures and methods to accomplish tasks.
- Applies organizational policies; may interpret organizational policies and recommend exceptions.
- Establishes work methods, timetables, performance standards, etc.
- Develop test plans, test cases, test scripts and test reports on multiple projects of varying size.
- Perform testing on various software, telecom and reporting systems.
- Validate that user expectations are achieved during the testing process.
- Review user requirements documents to ensure that requirements are testable.
- Six Sigma Black Belt

### **Business Intelligence Specialist (Analytics)**

- Experience using advanced SQL queries to extract data for use in analysis and presentations.
- Experience investigating and solving complex technical problems and data discrepancies.
- Working knowledge of Python, R or other language for scripting and more advanced analyses.
- Some experience with data visualization applications such as Tableau.
- Advanced expertise with Excel.
- Experience with Power BI.
- Experience with statistical analysis, quantitative analysis, forecasting/predictive analytics, multivariate testing.
- Project management experience.
- Experience in process and requirements documentation.
- Experience with Teradata.
- Experience with statistical analysis, quantitative analysis, forecasting/predictive analytics, multivariate testing.
- Project management experience.
- Experience in process and requirements documentation.
- Requires broad and proficient knowledge of modern techniques in scripting, experience querying databases and using distributed data/computing tools

### **Geographic Information Specialist**

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- Develops advanced specialized maps, utilizing geographic and demographic information using programming, database, and graphics skills. Assists with Mapping Center quality control processes while adhering to company policy on quality assurance.
  - Creates and modifies maps, graphs, or diagrams using geographic information software and related equipment.
  - Translates data from outside sources and converts data to assist users.
  - Enters, corrects, and debugs database records.
  - Collects and organizes statistical data.
  - Maintains records
  - Experience in SQL or Python
  - Advanced proficiency in ArcPRO, AGOL and ESRI software's
  - Knowledge of GIS terms and definitions, real estate terms and definitions, real estate analytical methods required. Proficiency in ArcPRO and GIS-related technologies required
  - Requires broad and proficient knowledge of modern techniques in scripting, experience querying databases and using distributed data/computing tools

### **Change Management Specialist**

- Apply a structured change management approach and methodology for the impact to personnel caused by projects and change efforts
- Identify potential personnel risks and anticipated points of resistance, and develop specific plans to mitigate or address the concerns
- Understand client's organization and change management issues, explain the factors involved and shape organizational solutions to deliver value to the client
- Conduct organizational change readiness assessments, evaluate results and present findings in a logical and easy-to-understand manner
- Support the execution of change management plans by employee-facing managers and business leaders
- Develop a set of actionable and targeted change management plans – including communication plan, sponsor roadmap, coaching plan, training plan, stake holder analysis and resistance management plan
- Support training and coaching work closely with communications, HR and organization development teams to support the implementation of the plans
- Be an active and visible coach to executive leaders who are change sponsors
- Create and manage measurement systems to track and report on adoption, utilization and proficiency of individual changes
- Identify resistance and performance gaps, and work to develop and implement corrective actions
- Assist with draft communications regarding workforce and organizational transitions and assist as needed with facilitating meetings
- Identify potential personnel risks and anticipated points of resistance, and develop specific plans to mitigate or address the concerns
- Develop surveys, newsletters, and other communication materials as needed
- Facilitate project meetings, assign and manage tasks for change activities
- Support status reporting requirements and timelines

### **Project/Program Manager**

- Migration Strategy
- Resource Management
- Decommission Strategy
- Implementation Approach
- Master Schedule

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- Methodology: Waterfall and Agile
  - Communication Plan
  - Vendor Management
    - Perform oversight and work with the AIM's 3rd-Party network vendors (i.e., Cisco, Comcast, AT&T, etc.)
    - Manage implementation of network hardware and software
    - Plan and manage new circuit installations and provisioning
    - Collaborate with AIM to establish the metrics for tracking, measuring, and reporting, Security Incident Event Management, and traffic logs
  - Provide weekly status reporting
  - Project documentation
    - Assessment
    - Charter, Cutover Plan, and Project Mgt Plan
    - Requirements
    - Design and architect
      - A detailed description of system installation, schematics, configuration and integration documentation must be included.
    - As-built documents and diagrams
    - Isolate, track, and resolve incidents, issues, and problems dealing with the project or program (Defects Log)
    - Resolve and document outages as they occur during implementation with minimal downtime
    - Complete and facilitate COA Change Management and STRB (Standard Technology Review Board) protocols
    - Root Cause Analysis: In the event of a post major outage, the Program Management Provider will be required to generate a Root Cause Analysis report (RCA) for any network event.
    - Comprehensive test plan, system testing, and user acceptance strategies.
    - Provide oversight of the Post-Production Vulnerability and Penetration Assessments with Security Provider
    - Maintenance and post support strategy
    - Lesson Learned documentation
  - The Project Manager and/or Program Manager must have a minimum of five (5) years of experience in implementing infrastructure upgrades and preferably must have a PMP certification within the past five (5) years.

### **Technical Writer**

- The fast-paced, team-driven environment provides the opportunity to work as a key contributor on high priority initiatives by developing technical documentation and supporting technology operations while maintaining the highest standards of quality.
- Planning, organizing, writing and editing operational, maintenance, test procedure manuals, or training materials
- Researching technical design specifications, interface design, design diagrams or test specifications
- Acquiring and organizing basic source material, including applicable specifications, engineering write-ups, and drawing packages
- Coordinating the layout and design of the material
- Working with systems analysts and programmers to create and edit application and systems documentation, user manuals, training courses, and procedures

- Preparing proposals and technical reports and works with project managers
- Experience writing:
  - Software technical content
  - User guides
  - Installation guides
  - Configuration guides
  - Understand TCP/IP and its suite of protocols
  - Know Cisco router configuration and operation (or equivalent)
  - Know IP addressing and variable length sub-net masking techniques
  - Know baseband and RF technologies

## **RF Engineer**

- Wireless Communication Systems, Radio Systems, Wireless Standards including but not limited to AMPS, TDMA, GSM, GPRS, EDGE, UMTS, CDMA, CDMA2000, EVDO, EVDV, WCDMA, iDEN etc. Wireless Propagation Models, BTS, RF amplifiers, combiners, converters, filters, BDA, Antenna Theory and Propagation, E911 Wireless System Design Tools such as Wireless Valley, Site Planner, dB Planner TEMS, Invex 3G, Map Info, Wizard etc. Design, optimization and maintenance of Fiber DAS based on LGC Wireless model. Layered LGC Wireless DAS with double-star architecture with 3 components: Main Hub, Expansion Hub, RAU. LGC Wireless InterReach Unison solution providing software-controlled configurations to support multiple wireless protocols.
- Responsible for assisting with the design, implementation and full maintenance of an in-building Distributed Antenna System (DAS) that supports different technologies including but not limited to TDMA, CDMA, GSM, GPRS, EDGE and 3G. The candidate will coordinate with the Cellular and PCS providers to incorporate their requirements in the design of the system. The candidate will also coordinate with the service providers to successfully implement, test and commission the wireless system. Coordinate service provisioning, and maintenance (including add, moves and changes) with multiple Wireless Service providers. Ensure that airport and the Providers are in compliance with all FCC rules and regulations.
- Minimum Qualifications:
  - Strong and demonstrated expertise in design, implementation and maintenance of LGC Wireless Fiber based In-building Distributed Antenna System (DAS) for multiple Wireless Service Providers using different wireless standards and protocols.
  - Strong experience in Layered LGC Wireless DAS with double-star architecture with 3 components: Main Hub, Expansion Hub, RAU.
  - Experience with LGC Wireless InterReach Unison solution providing software-controlled configurations to support multiple wireless protocols.
  - Strong background in Wireless Communication Systems, Radio Systems and an in-depth knowledge of Wireless Standards including but not limited to AMPS, TDMA, GSM, GPRS, EDGE, UMTS, CDMA, CDMA2000, EVDO, EVDV, WCDMA, iDEN etc.
  - Strong background in Wireless Propagation Models with demonstrated ability to use different wireless propagation models in different in-building environments for designing wireless systems.
  - Experience with BTS, RF amplifiers, combiners, converters, filters, BDAs etc.
  - Sound understanding of Antenna Theory and Propagation.
  - Background of E911 and its implications for an In-Building Wireless System.
  - Monitor and analyze statistical and test data to improve system performance indicators such as dropped calls, origination failures and handoffs to meet DOA goals.
  - Candidate must have the used In-Building Wireless System Design Tools like Wireless Valley, Site Planner, dB Planner etc. to design other in-building wireless systems. Ability to optimize design using these models is also required.

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- Knowledge and use of Wireless Testing tools for different Wireless Standards like TEMS, Invenx 3G, etc.
  - Experience with different Wireless Network Tools like Map Info, Wizard etc.
  - Experience in Radio Engineering in Wireless Network Optimization, RF signal parameter measurement and evaluation.
  - Experience with multiple wireless equipment vendors for in-building systems.

## **NOC Engineer**

Monitor and maintain state-of-the-art WIFI and disturbed cellular antenna system. Facilitate the addition, removal, or modification of users and systems on the SONET backbone and wireless system; Monitoring, maintenance, and operational support of the backbone infrastructure and the wireless system network through software utilization of HPOV. Troubleshoot and resolve wireless hardware and software issues on the HJAIA network. Utilize the Heat trouble ticketing system to track ongoing reports and service requests. Support operational security through physical and logical access control. Ensure that a daily back up of all servers are performed. Participate in on-call rotation and company and/or team meetings. Answer end user questions via the 800 number while providing world-class service to customers. Provide superior service, communicating clearly with customers via telephone and email. Willingness to work in team-based environment.

### **Minimum Qualifications**

Familiarity and expertise in ALL the following:

- a. Minimum CCNA
- b. Cisco ONS 15454
- c. Cisco Catalyst 3500 and 6500 series switches
- d. BlueSocket Wireless Gateway
- e. AirDefense Intrusion Detection system
- f. HPOV ver. 7.5 or higher
- g. Cisco Aironet access point
- h. Cisco Works
- i. Cisco Transport Manager
- j. Cisco WLSE

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## Qualification and Skills Criteria

### Executive Summary

The executive summary shall include the following information:

1. Provide the legal name of the entity responding to this proposal.
2. Provide the business type of the entity responding to this proposal (i.e. Joint Venture, Partnership, etc.).
3. Include a brief statement of approach to the work, understanding of the project's goals and objectives and demonstrated understanding of the project's potential problems and concerns.
4. Name, address, telephone number, and email address of one (1) individual to whom all future correspondence and/or communications will be directed.

### Professional Consulting Services Experience

Please Describe-

1. Describe how your firm will service the COA account. The description shall include detailed information on the process in which your agency provides IT staffing placements from initial request to final invoicing.
2. All projects/contracts submitted under these technical proposal criteria must be a maximum of five (5) years old based on the project contract completion date with higher consideration given to projects less than three (3) years old. A minimum of one (1) project/contract must be for a public sector client, with higher consideration in the evaluation if more than one is for a public sector client.
3. **Completeness of deliverables in SOS with explanations and comments on the capabilities being requested. For example, if your solution does not have a capability, but fills the requirement via some other feature, please explain how it would work.**
4. **Please describe the fulfilment end-to-end process, including detailed description (e.g. initial request to invoicing), process maps, web portal, etc.**
5. **Note:** All consultants must have reliable transportation for site-to-site visits and will be responsible for paying for parking.

### Project Team Qualifications/ Qualifications of Key Personnel

Provide resumes for the executive leadership of the Prime (i.e. CEO, Principal-In-Charge; Staff Recruiter; Chief Financial Officer, Owner, etc.). **Additionally, The Prime must provide resumes within their proposal submission for the following Key Personnel:**

- a. **Project/Program Manager**
- b. **Solutions Developer**
- c. **Cloud Architect**
- d. **Cloud Administrator**
- e. **Cloud Developer**
- f. **Server Engineers**
- g. **Network Architect**
- h. **Network Engineer**

1. All proposed personnel must meet the minimum job description and work experience as outlined above.
2. Each resume should be limited to no more than three (3) pages per person and be organized according to the following: 1. Name and Title, 2. Professional Background, 3. Current and Past, 4. Relevant Work Experience, 5. Certifications, 6. Include two (2) references for each key personnel member on similar projects.

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## Relevant Project/Consulting Experience

Identify seven (4) projects/references where the Prime has performed projects similar in size and scope with entities comparable to the City of Atlanta within the past **three (3)** years. Limit your response to one (1) page per project; please provide the following information for each project:

1. The name of the project, the owner, year performed and the project location.
2. A description of the project.
3. A reference, including a contact name, addresses, phone number and email address. This reference should be the owner's staff member who oversaw the project for the owner.

All contractors requested must successfully undergo a Federal Bureau of Investigation (FBI) fingerprint based criminal history check that reveals no convictions of disqualifying crimes within the last ten (10) years.

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## Glossary of Terms

Acronym	Defined As...
AWS	Amazon Web Services
S3	Simple Storage System
GCP	Google Cloud Platform
GCLB	Google Cloud Load Balancer
Amazon ES	Amazon Elasticsearch Service
AMI	Amazon Machine Image
ARN	Amazon Resource Name
EC2	Elastic Compute Cloud
ECS	EC2 Container Service
EFS	Elastic File System
EMR	Elastic Map Reduce
IaaS	Infrastructure-as-a-Service
SWS	Simple Workflow Service
SNS	Simple Notification Service
GCS	Google Cloud Storage
VPC	Virtual Private Cloud
Amazon EBS	Amazon Elastic Block Store
AZ	Availability Zone
ASG	Auto Scaling Group
EBS	Elastic Block Store
ELB	Elastic Load Balancer
EIP	Elastic IP
ENI	Elastic Network Interface
FaaS	Function as-a-Service
HPC	High-Performance Compute
HVM	Hardware Virtual Machine
S3 IA	S3 Infrequent Access

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IG	Internet Gateway
KMS	Key Management Service
Amazon SES	Amazon Simple Email System
RRS	Reduced Redundancy Storage
SQS	Simple Queue Service
TPM	Trusted Platform Module
VPG	Virtual Private Gateway
VPS	Virtual Private Server
HP CSA	HP Cloud Service Automation

### **Blogging/SEO**

Acronym	Stands for...
SEO	Search Engine Optimization
SCM	Search Content Marketing
SEM	Search Engine Marketing
WP	WordPress
PPC	Pay Per Click
CPC	Cost Per Click
SERP	Search Engine Results Page
CTS	Click-Through Rate
CR	Conversion Rate
CPM	Cost Per Thousand Impressions
SVG	Scalable Vector Graphics
DMCA	Digital Millennium Copyright Act
CMS	Content Management System
CRO	Conversion Rate Optimization
CTA	Call to Action
CTR	Click Through Rate
PR	PageRank
DA	Domain Authority

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ROI	Return on Investment
UI/UX	User Interface/User Experience
SEA	Search Engine Advertising
SMO	Social Media Optimization
SMM	Social Media Marketing
SERM	Search Engine Reputation Management
AMA	Ask Me Anything
B2B	Business to Business
B2C	Business to Consumer
CRM	Customer Relationship Management
CX	Customer Experience
FOMO	Fear of Missing Out
GA	Google Analytics
IO	Insertion Order
SM	Social Media
SMP	Social Media Platform
ToS	Terms of Service
UA	Universal Analytics
CPL	Cost Per Lead
NPS	Net Promoter Score
QDD	Query Deserves Diversity
QDF	Query Deserves Freshness
SC	Supplementary Content
ZMOT	Zero Moment of Truth
HITS	Hyperlink-Induced Topic Search
LSI	Latent Semantic Indexing
PBN	Private Blog Network
Artificial Intelligence	
AI	Artificial Intelligence
IMS	Intelligent Maintenance Systems

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ML	Machine Learning
NI	Natural Intelligence
MI	Machine Intelligence
NLP	Natural Language Processing
CNN	Convolutional Neural Network
RNN	Recurrent Neural Network
LSTM	Long Short-term Memory
CTC	Connectionist Temporal Classification
CV	Computer Vision
HMD	Head Mounted Displays
RL	Reinforcement Learning
NLNN	Non-Learning Neural Networks
SR	Speech Recognition
M2M	Machine to Machine
DSBS	Dual Sensor Brake Support
LNN	Learning Neural Networks
NLU	Natural Language Understanding
RPA	Robotic Process Automation
ANN	Artificial Neural Network

#### **Database**

SQL	Structured Query Language
DQL	Data Query Language
DDL	Data Definition Language
DML	Data Manipulation Language
RDSMS	Relational Data Stream Management System
OLAP	Online Analytical Processing
OLTP	Online Transaction Processing
DRDA	Distributed Relational Database Architecture
4D QL	4D Query Language

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DMS	Database Migration Service
DBA	Database Administrator

## Development

FIFO	First In First Out
PHP	Hypertext Preprocessor
HTML	Hypertext Markup Language
JS	JavaScript
CSS	Cascading Style Sheets
SaaS	Software-as-a-Service
API	Application Programming Interface
XML	Extensible Markup Language
SOAP	Simple Object Access Protocol
XHTML	Extensible Hypertext Markup Language
JSON	JavaScript Object Notation
EOF	End Of File
SDK	Software Development Kit
ASCII	American Standard Code for Information Interchange
I/O	Input & Output
WYSIWYG	What You See Is What You Get
VCS	Version Control Systems
IDE	Integrated Development Environment
Java EE	Java, Enterprise Edition
EOL	End Of Life
XSD	XML Schema Definition
VBS	Visual Basic Script
RAD	Rapid Application Development
JCE	Java Cryptography Extension
JDK	Java Development Kit

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IPSec	Internet Protocol Security
SSE	Server Side Encryption
SSL	Secure Socket Layer
TLS	Transport Layer Security
DOS	Denial of Services
DDoS	Distributed Denial Of Services
XSS	Cross-site Scripting
CSP	Content Security Policy
CSRF	Cross-Site Request Forgery
SQLi	SQL Injection
CBSP	Cloud-based Security Providers
ACL	Access Control List
AES	Advanced Encryption System
CORS	Cross-Origin Resource Sharing
IAM	Identity & Access Management
MFA	Multi-Factor Authentication
WAF	Web Application Firewall
OWASP	Open Web Application Security Project
MITM	Man in the Middle Attack
PCI DSS	Payment Card Industry Data Security Standard
SAML	Security Assertion Markup Language
STS	Security Token Service
FUD	Fully Undetectable
RAT	Remote Administration Tool
SE	Social Engineering
SKid	Script Kiddie
DNSSEC	Domain Name System Security Extensions
DKIM	Domain Keys Identified Mail
DMARC	Domain-based Message Authentication Reporting and Conformance
SPF	Sender Policy Framework

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CVSS	Common Vulnerability Scoring System
SAST	Static Application Security Testing
DAST	Dynamic Application Security Testing
WAP	Web Application Protection
RFI	Remote File Inclusion
LFI	Local File Inclusion
DT	Directory Traversal
PT	Path Traversal
SCD	Source Code Disclosure
OSCI	OS Command Injection
CWE	Common Weakness Enumeration
DSA	Digital Signature Algorithm
DES	Data Encryption Standard

#### **Server/IT Infrastructure**

OSS	Open Source Software
FOSS	Free and open-source software
OS	Operating System
HA	High Availability
BYOD	Bring Your Own Device
PaaS	Platform-as-a-Service
DaaS	Desktop-as-a-Service
VM	Virtual Machine
KVM	Kernel-based Virtual Machine
ESX	Elastic Sky X
DRS	Distributed Resource Scheduler
VSM	Virtual Supervisor Module
QEMU	Quick Emulator
SSD	Solid-state Drive
IOPS	Input/output Operations Per Second

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ADFS	Active Directory Federation Service
CLI	Command Line Interface
CI/CD	Continous Integration/Continous Deployment
iSCSI	Internet Small Computer Storage Interface
SSH	Secure Shell
MSTSC	Microsoft Terminal Service Client
MPP	Massive Parallel Processing
NFS	Network File System
RAID	Redundant Array of Independent Disk
RAM	Random-access Memory
SLA	Service Level Agreement
OLA	Operational-level Agreement
SSO	Single Sign-On
VTL	Virtual Tape Library
VDI	Virtual Desktop Infrastructure
BIOS	Basic Input Output System
DVD	Digital Versatile Disc
PSU	Power Supply Unit
ROM	Read Only Memory
UPS	Uninterruptible Power Supply
DC	Data Center
GUI	Graphical User Interface
TPU	Tensor Processing Unit
RISC	Reduced Instruction Set Computer
AU	Activation Unit
ALU	Arithmetic Logic Units
AVX	Advanced Vector Extensions
P2V	Physical to Virtual
VXLAN	Virtual Extensible Local Area Network
VCS	Veritas Cluster Server

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HAC	High-availability Clusters
RUM	Real-user Measurement
ERP	Enterprise Resource Planning
BPO	Business Process Outsourcing
BI	Business Intelligence
IT	Information Technology
DW	Data Warehouse
WINS	Windows Internet Name Service
WMI	Windows Management Instrumentation
VG	Volume Group
TTY	Teletype
SFTP	SSH File Transfer Protocol
SAN	Storage Area Network

#### **Network/Internet**

DNS	Domain Name System
HTTP	HyperText Transport Protocol
HTTPS	HyperText Transport Protocol Secure
CDN	Content Delivery Network
LAN	Local Area Network
WAN	Wide Area Network
DHCP	Dynamic Host Configuration Protocol
TCP	Transmission Control Protocol
IP	Internet Protocol
WWW	World Wide Web
IoT	Internet Of Things
D2D	Device to Device
VPN	Virtual Private Network
BGP	Border Gateway Protocol
VLAN	Virtual Local Area Network

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DOM	Document Object Model
UDP	User Datagram Protocol
CIDR	Classless Inter-Domain Routing
VIP	Virtual IP
ICMP	Internet Control Message Protocol
LB	Load Balancer
SMTP	Simple Mail Transfer Protocol
FTP	File Transfer Protocol
RDP	Remote Desktop Protocol
MPLS	Multi-Protocol Label Switching
NS	Name Server
NAT	Network Address Translation
SOA	Start of Authority
TTL	Time To Live
TPS	Transaction Per Second
NDA	Nondisclosure Agreement
AP	Access Point
MAC	Media Access Control
NIC	Network Interface Card
ISP	Internet Service Provider
URL	Uniform Resource Locator
PDF	Portable Document Format
TLD	Top-level domain
RSS	Really Simple Syndication
IFTTT	If This Then That
IE	Internet Explorer
AFAIK	As far as I Know
CAN-SPAM	Controlling the Assault of Non-Solicited Pornography and Marketing Act
DM	Direct Message
FB	Facebook

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PM	Private Message
QoS	Quality of Service
MIME	Multipurpose Internet Mail Extensions
POP	Post Office Protocol
IMAP	Internet Message Access Protocol
CNAME	Canonical Name
MX	Mail Exchange
PPTP	Point-to-Point Tunneling Protocol
LLT	Low Latency Transport
POP (CDN)	Point Of Presence of CDN
ASN	Autonomous System Number
SCM (Commerce)	Supply Chain Management
WPAN	Wireless Personal Area Network
WLAN	Wireless Local Area Network
URI	Uniform Resource Identifier
TTF	TrueType Font
NACK	Negative ACKnowledgement
HAR	HTTP Archive
QUIC	Quick UDP Internet Connections
<b>Telecom</b>	
AFC	Automatic Frequency Control
ATC	Alarm Traffic Controller
ATM	Asynchronous Transfer Mode
BW	Bandwidth
CATV	Cable Television
CODEC	COder DECoder
DCME	Digital Compressed Multiplication Equipment
DP	Data Processing
DSS	Direct Satellite Services
DTH	Direct

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to	Home
DTMF	Dual Tone Multiple Frequency
EIRP	Equivalent Isotropic Radiated Power, the power a satellite can project to a point on the earth's surface.
FDM	Frequency Division Modulation
FSS	Fixed Satellite Service
GEO or GSO	Geostationary Earth Orbit
Hz	Hertz
kHz	kilohertz (thousand hertz)
MHz	Megahertz (million hertz)
MiTTs	Minutes of Telecommunications Traffic
OC	Optical Carrier
RFT	Radio Frequency Transmitter
SDLC	Synchronous Data Link Control
TMN	Telecommunication Management Network
UMTS	Universal Mobile Telecommunications System
VPS	Voice Processing System

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